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## NUMBER THEORY AND DIOPHANTINE ANALYSIS.

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165. Proposed by J. EDWARD SANDERS, Weather Bureau, Chicago, Ill.

Factor (if possible), 11, 111, 111, 111.

166. Proposed by H. S. VANDIVER, Bala, Pa.

Eliminate any five of the seven quantities  $h, j, k, l, m, r, s$ , from:

$$\begin{aligned} j+m+r &= k+l+s, \\ h &= 3(r+s) - (n+1), \\ j+m+2r+s &= n, \\ hr+j^2+km+ms &= jk+mr+s^2+rs, \\ ks+jl+rs+r^2 &= sh+jk+l^2+rk, \\ hr+jl+ks+ls+km &= jm+mr+2rs+rj. \end{aligned}$$

167. Proposed by R. D. CARMICHAEL, Anniston, Ala.

Prove that  $\prod \frac{p+(-1)^{\frac{1}{2}(p+1)}}{p-(-1)^{\frac{1}{2}(p+1)}} = 2$ , the consecutive values of  $p$  being the natural odd primes in order.

## AVERAGE AND PROBABILITY.

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204. Proposed by F. P. MATZ, Reading, Pa.

On a random chord in a circle two points are taken at random. What is the chance a second chord drawn at random will pass between the two points?

205. Proposed by J. EDWARD SANDERS, Weather Bureau, Chicago, Ill.

What is the probability that the triangle formed by joining three points, one at random in each of three equal circles, mutually tangent, has an obtuse angle?

## NOTES AND NEWS.

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Professor L. E. Dickson left on September 4th for Europe, where he will spend the year in study and travel. F.

Professor R. D. Carmichael has been granted a year's leave of absence and is now studying mathematics at Princeton. F.

Professor B. F. Yanney, of Mount Union College, Alliance, Ohio, has been granted a year's leave of absence. He will spend the year in study at the University of Chicago. F.

Professor W. A. Manning of Stanford University, secretary of the San Francisco Section of the American Mathematical Society, has joined the mathematical faculty of the University of Illinois for one year in exchange with E. W. Ponzer. Professor Manning is the author of various articles on substitution groups. M.